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Indian Standard

SPECIFICATION FOR DENTAL ENGINE, ELECTRIC

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

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Indian Standard

SPECIFICATION FOR DENTAL ENGINE, ELECTRIC

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 December 1970, after the draft finalized by the Dental Equipment Sectional Committee had been approved by the Consumer Products Division Council.

0.2 This standard is one of a series of Indian Standards on dental equipment and instruments and has been formulated at the instance of the Advisory Committee for Development of Surgical Instruments, Equipment and Appliances, Government of India.

0.3 In this standard, five types of electric dental engine have been specified, based on holding arrangement with the electric motor. For power transmission to the handpiece, dental section arm and cable arm to be used with the engine have been covered in separate standards. This standard covers only the esssential requirements of electric dental engine; the shape of the engine has been left to the choice of the manufacturers in order to leave room for further developments.

0.4 This standard contains clauses **4.1**, **5.4**, and **8.1** which call for agreement between the purchaser and the supplier.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of electric dental engine.

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*Rules for rounding off numerical values (*revised*).

2. TYPES

2.1 The electric dental engine shall be of the following five types:

Type A — Stand type (mobile)
Type B — Wall type
Type C — Unit type (externally mounted)
Type D — Hanging type
Type E — Table type

3. NOMENCLATURE

3.1 For the purpose of this standard, the nomenclature relating to electric dental engine shall be as given in Fig. 1 to 5.

4. MATERIAL

4.1 The principal parts of the electric dental engine may be made from the following materials:

Type	*Part*	*Material*	*Conforming to*
A	(i) Base	Cast iron	Grade 15 of IS : 210-1962*
		or	
		Mild steel, pressed	—
	(ii) Supporting column	ERW steel tube	IS : 3601-1966†
		or	
		Extruded steel tube	—
		or	
		Extruded aluminium tube	—
B	(i) Wall bracket	Cast iron	Grade 15 of IS : 210-1962*
		or	
		Cast aluminium	—
	(ii) Bracket arms	Steel sheet	IS : 1079-1968‡
		or	
		Steel section	—
C	Mounting	ERW steel tube	IS : 3601-1966†
		or	
		Extruded steel tube	—
		or	
		Extruded aluminium tube	—
D	Hook	Mild steel	—
E	(i) Base	Cast iron	Grade 15 of IS : 210-1962*
		or	
		Mild steel, pressed	—
	(ii) Supporting column	Mild Steel	—

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*Specification for grey iron castings (*revised*).

†Specification for steel tubes for mechanical and general engineering purposes.

‡Specification for hot rolled carbon steel sheet and strip (*second revision*).

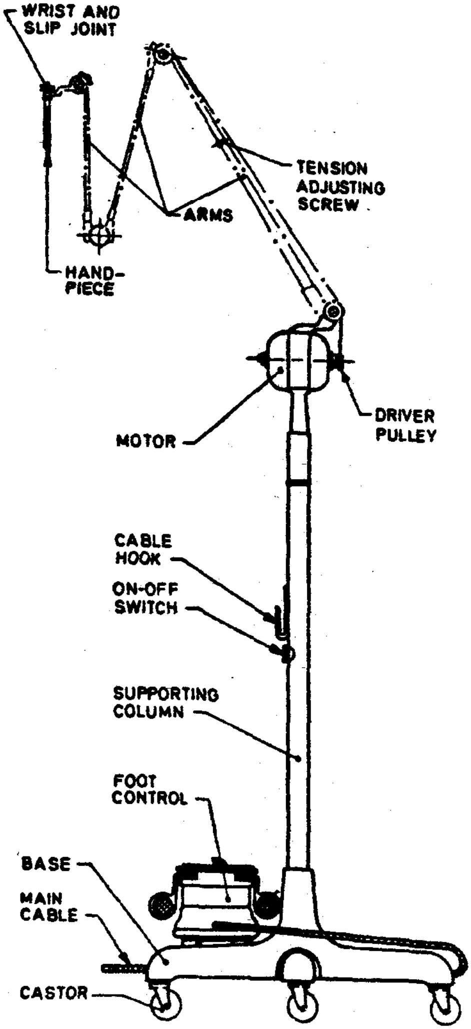

FIG. 1 DENTAL ENGINE, ELECTRIC, TYPE A

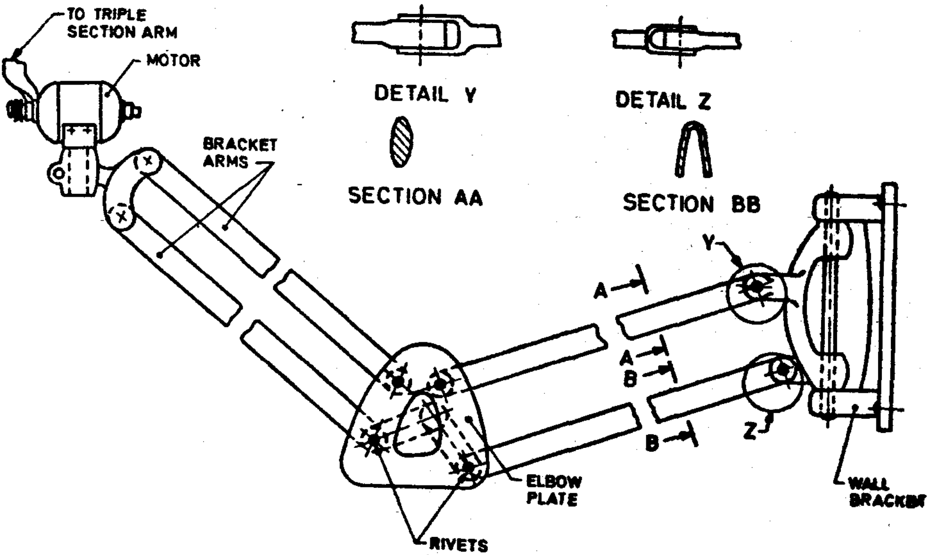

FIG. 2 DENTAL ENGINE, ELECTRIC, TYPE B

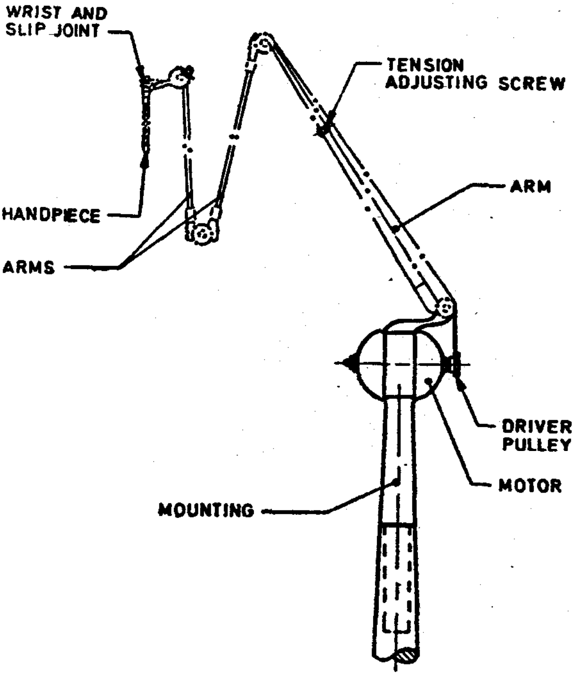

FIG. 3 DENTAL ENGINE, ELECTRIC, TYPE C

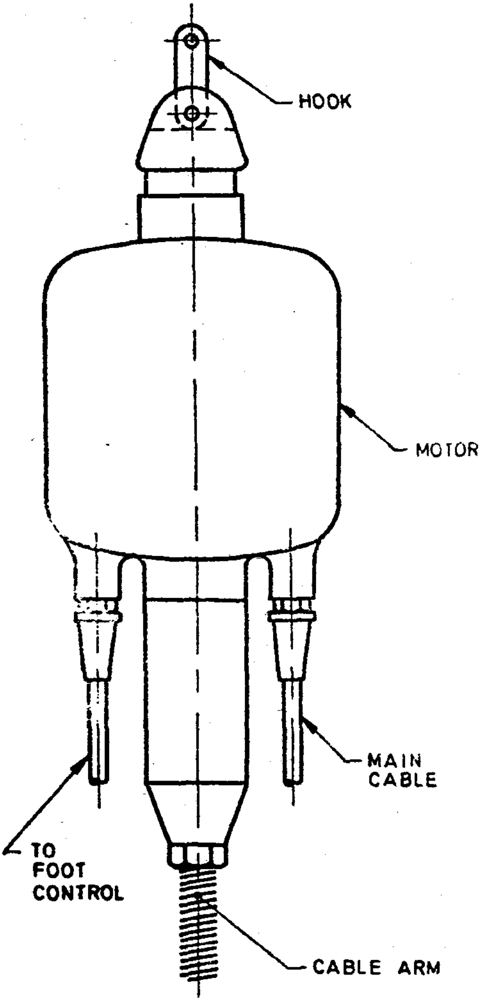

FIG. 4 DENTAL ENGINE, ELECTRIC, TYPE D

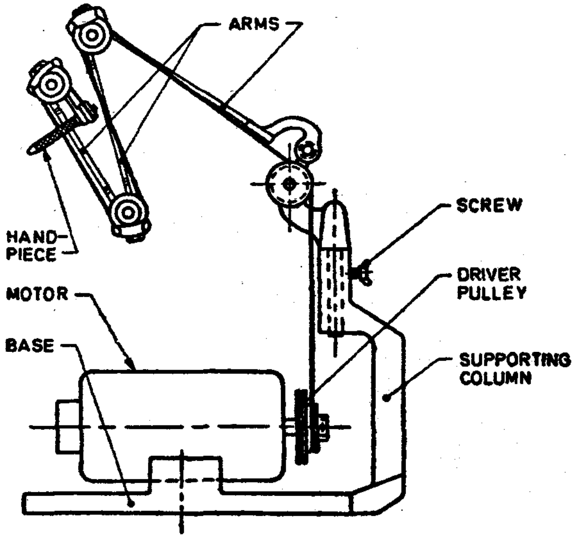

FIG. 5 DENTAL ENGINE, ELECTRIC, TYPE E

5. WORKMANSHIP AND FINISH

5.1 The surfaces of the engine shall be finished smooth and shall be free from cracks, pits and other imperfections. The edges shall be even and rounded.

5.2 The base of the electric dental engine of Types A and E shall be cast sound, free from pits, cracks, holes and other defects, and shall be dressed smooth all over. It shall be sufficiently heavy to prevent the engine from overturning and shifting during use.

5.3 Type A electric dental engine shall have castors conforming to HN80 of IS:4034-1968* fitted to the base for its easy transportation. Type B engine shall sweep in horizontal and vertical planes smoothly.

5.4 The electric dental engine shall be painted (*see* IS:4033-1968†) with a suitable enamel paint. The colour of the paint shall be white, off-white or sea-green as agreed to between the purchaser and the supplier.

5.5 The engine shall be properly earthed.

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*Specification for castors for hospital equipment.
†General requirements for hospital furniture.

6. PERFORMANCE REQUIREMENTS

6.1 Electric Motor — The electric motor used in the electric dental engine shall be single phase induction motor and shall fulfil the following performance requirements:

Rated output	125 to 250 W
Voltage	220 to 250 V
Frequency	50Hz (50 c/s)
Highest speed attainable	5 000 rev/min and above
Lowest speed	1 600 rev/min

6.1.1 The overheating shall not exceed 40°C above room temperature when the engine is run for half an hour continuously.

6.1.2 The leakage current on any portion of the dental engine shall not exceed 300μA (Peak) (*see* IS:302-1967*) when tested by the method given in Appendix A.

6.1.3 The speed of the motor shall be controlled by a control switch. The control switch shall be capable of adjusting three different forward speeds and three different reverse speeds.

6.1.4 The dental engine of Types A, B, C and E shall be fitted with dental section arm. The dimensions of the dental section arm shall conform to IS:6183-1971†.

6.1.5 Type D engine shall be fitted with cable arm. The dimensions of the cable arm shall conform to IS:6182-1971‡.

6.2 The engine shall be well mounted so that it runs smoothly.

6.3 A suitable interference suppression device shall be provided with the engine.

7. MARKING

7.1 Each engine shall be legibly and indelibly marked with the following:

a) Manufacturer's name, initials or recognized trade-mark;
b) Country of manufacture;
c) Speeds of the engine; and
d) Voltage, wattage and the legend 'AC,50Hz (50 c/s)'.

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*General and safety requirements for light electrical appliances (*third revision*).
†Dimensions for dantal section arm (*under print*).
‡Dimensions for dental cable arm (*under print*).

7.1.1 The engine may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 The electric dental engine shall be packed as agreed to between the purchaser and the supplier or as given in **8.1.1**.

8.1.1 The loose parts of the electric dental engine shall be separately placed in a carrying case with all corners reinforced with sheet metal. The carrying case shall be provided with partitions spaced to give protection against shifting of parts. The carrying case shall be packed in wooden box with suitable cushioning material or paper cuttings filled in empty spaces.

APPENDIX A

(*Clause* 6.1.2)

MEASUREMENT OF LEAKAGE CURRENT

A-1. The test shall be carried out with a voltmeter having an internal impedence of at least 30 000 ohms on the measuring range used and a measuring accuracy of at least 5 percent at all frequencies between 20 and 5 000 Hz (c/s).

A-2. The electric dental engine shall be electrically isolated from earth. The interference suppression device fitted to the electric dental engine shall be disconnected. Between the housing and earth a resistance of 3 000 ± 150 ohms shall be connected (*see* Fig. 6). The voltage drop across this resistance shall give the measure of leakage current. The dental engine shall run continuously for one hour and immediately thereafter the leakage current shall be measured.

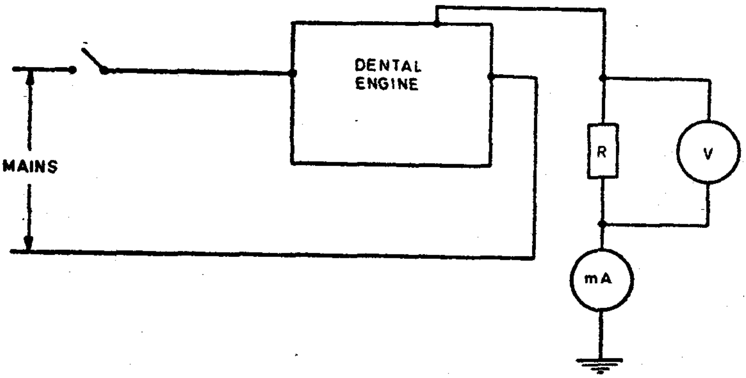

FIG. 6 CIRCUIT FOR MEASUREMENT OF LEAKAGE CURRENT

A-3. For Type C electric dental engine the voltage drop across the resistance shall be measured at the following operations:

a) Dental unit 'on' but motor 'off',

b) Dental unit 'on' and motor 'on', and

c) Operations (a) and (b) repeated with water 'on' and water 'off'.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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